

Today

- Lecture theory (30 min): Embedded systems
- Lab Discussion (20 min)

Embedded System Theory

Three categories of computer systems

- Personal computers
- Workstation servers
- Embedded system
 - Largest marketplace - Hundreds and hundreds of millions of embedded systems are produced annually

Embedded System

Special-purpose computer controlled electromechanical system

Computer controlled implies that there is a software component

Characteristics of embedded systems

- Real-time responsive – must respond to an event with a hard or soft time constraint
- Small form factor
- Cost-constrained
- High vibration environment

Personal computer systems are not real-time responsive.

Hard time constraint – if an event occurs, there is a guarantee that the computer will respond to that event within a set amount of time.

Interrupts are fundamental in accomplishing this.

Examples:

- Avionics controlling the autopilot of an airplane
- Robot in assembly line plant running a butane torch

Soft time constraint – desired response time, but one that is not necessarily required and therefore does not need to be guaranteed

Examples of embedded systems

- Cell phone
- Digital watch (?)
- Calculator
- Microwave
- Noise-cancelling headphones (?)
- Credit card swiper
- Elevators
- Radios

Categories of embedded systems

1. Appliances
2. Communications
3. Building Systems
4. Transportation
 - Planes, trains and automobiles
5. Audiovisual Entertainment
6. Gaming systems

Lab Discussion

Second day: complete communications board (other little circuit board)

Resistors



Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Resistors larger than 1/4W are generally not cylindrical

Single Inline Resistor Pack (SIP)

1k x 5 SIP Resistor Pack with common terminal/pin
All resistors share a common end

1k x 5 SIP Resistor Pack without common terminal/pin
No shared end

Capacitors

Axial – pins come out sides of cylinder

Radial – pins both come out of the bottom of the cylinder